

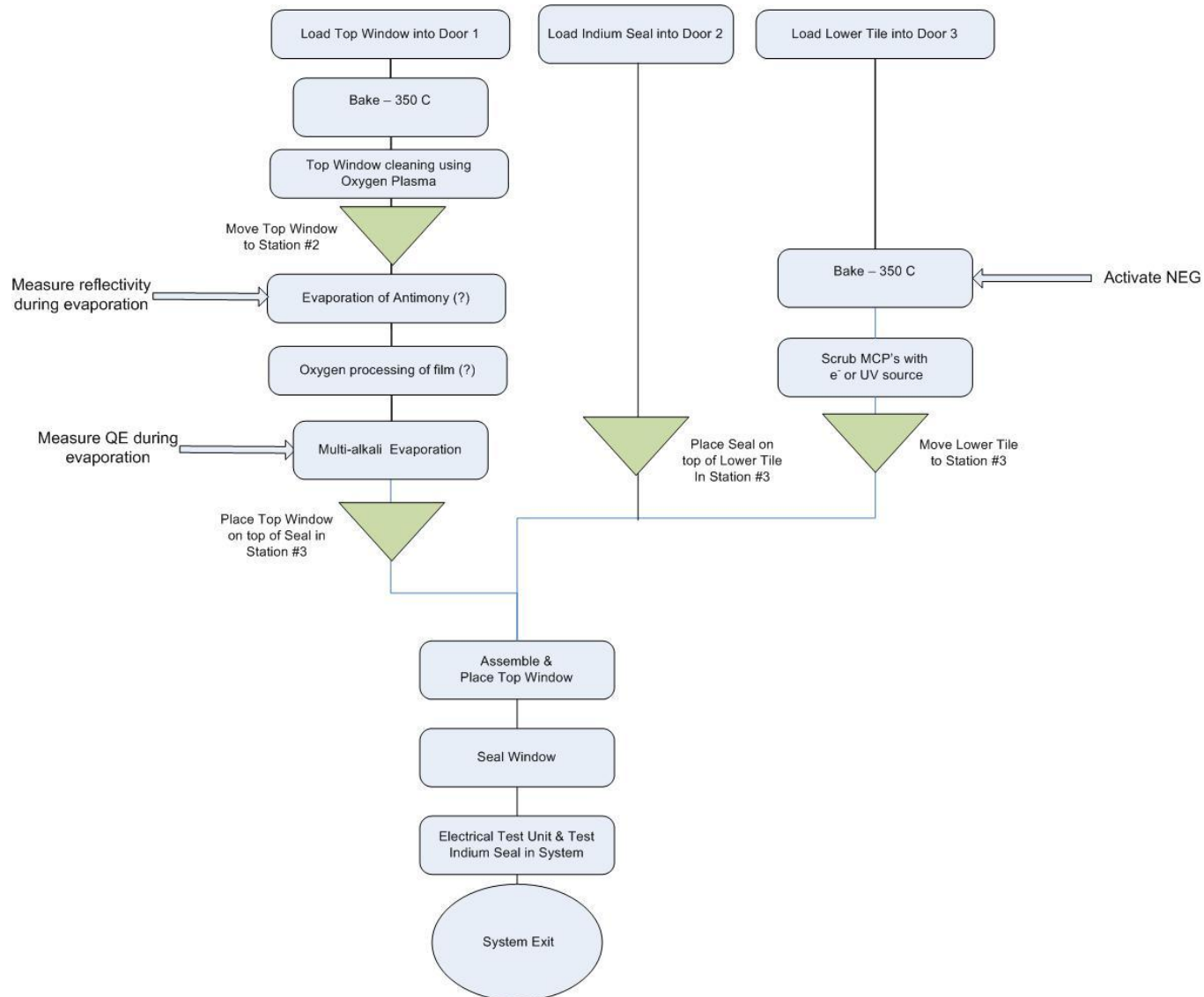
Single Tile Process System - Process and sample movement description

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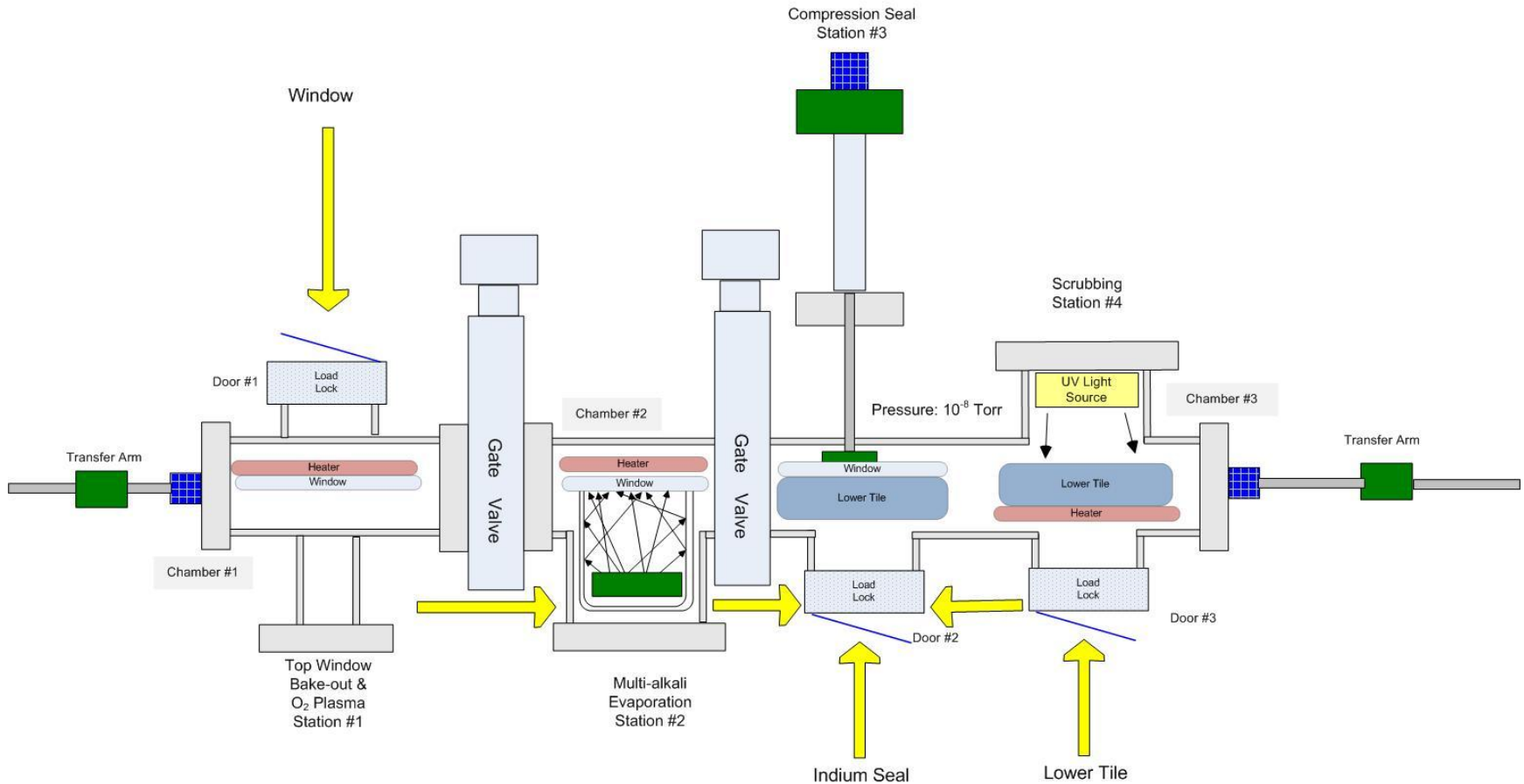
This is a summery of a simplified Tile production
machine for the LAPPD Project

Material Processing Flow Chart

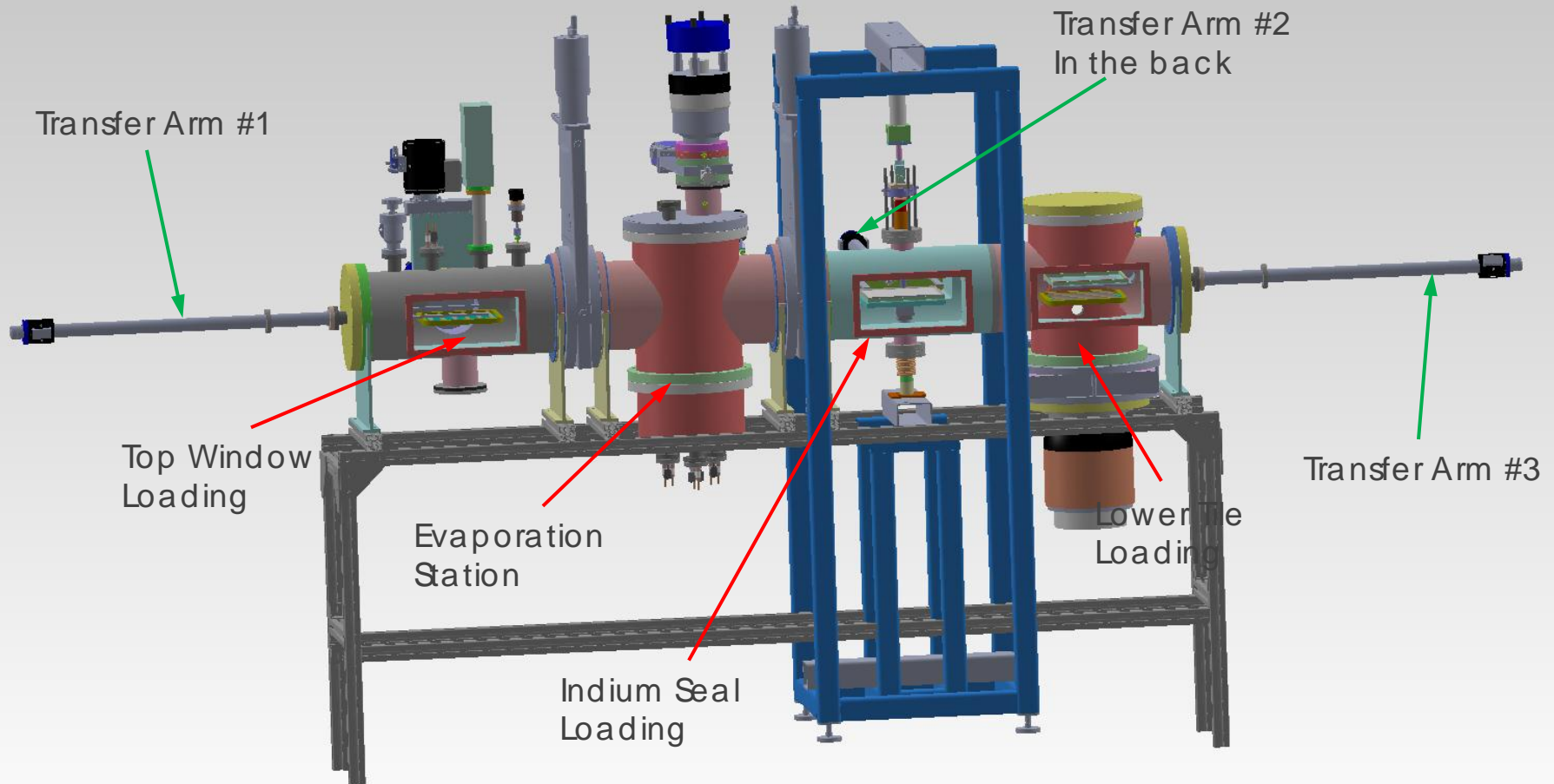


Simplified Single Tile Production System

Single Tile Production Machine



Single Tile System



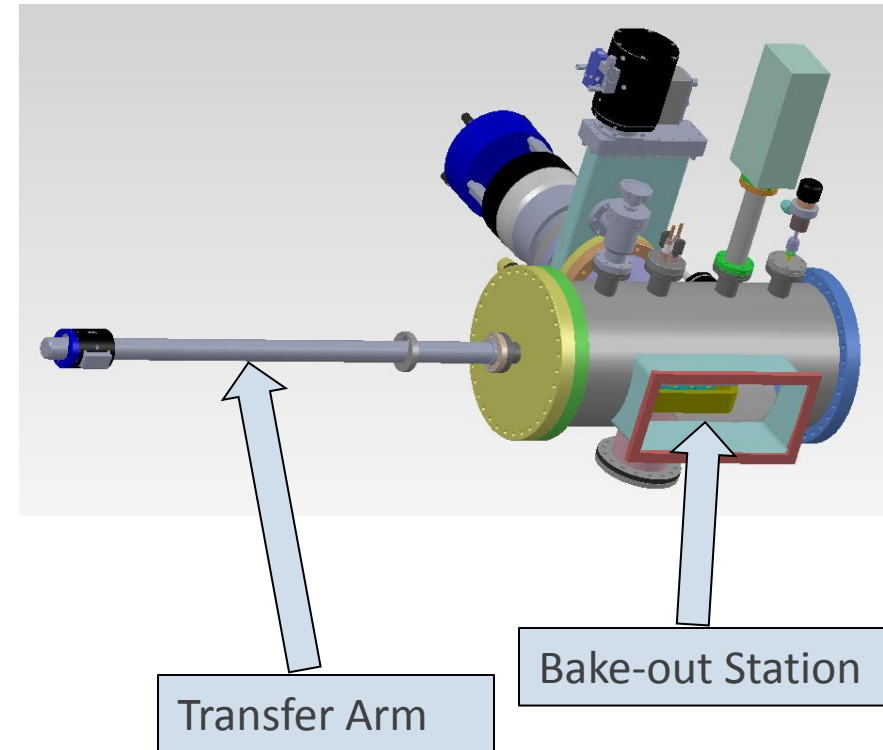
Transfer Arms Movement



Chamber #1

--Station #1 - Top Window loading and bake-out station

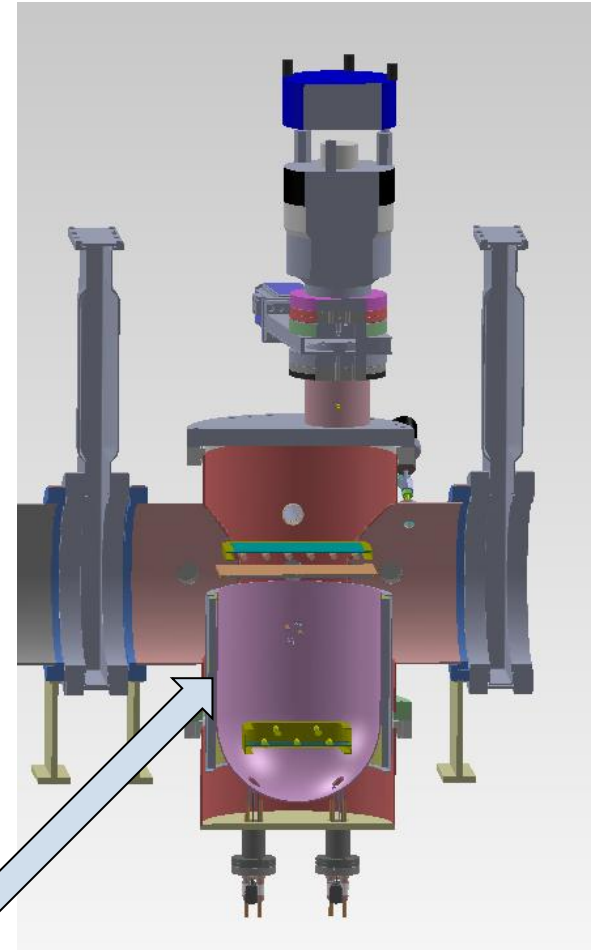
1. Functions
 1. Entry point of the Top Window
 2. Vacuum bake of the window
 3. Perform oxygen plasma treatment to window
 1. Control oxygen with the use of a MFC
 2. Throttle the pumping speed through the use of a by-pass valve will be used to stabilize the process pressure.
2. Sample Movement (using Transfer Arm #1)
 1. Operator manually inserts Top Window onto platen
 2. After processing, the transfer arm lifts the Top Window off the platen (~ 1 inch vertical)
 3. Transfer arm moves 28 (?) inches horizontally to Station #2
 4. Transfer arm lowers the Top Window onto the platen.
 5. Transfer arm retracts to Station #1 during the multi alkali evaporation
3. Total travel for Transfer Arm #1 is 72 inches 5 lbs. load without spatula weight.



Chamber #2 - Center chamber

--Station #2 - Multi alkali evaporation

1. Functions
 1. Station #2
 1. Multi Alkali will be evaporated onto the bottom face of the Top Window.
 2. Top Window can be electrically biased so the an in-situ quantum efficiency measurement can take place.
2. Sample Movement (using Transfer Arm #1)
 1. After processing, the transfer arm lifts the Top Window off the platen (~ 1 inch vertical)
 2. Transfer arm moves the top window horizontally to Station #3
 3. Transfer arm lowers the Top Window onto the lower tile assembly
 4. Transfer arm retracts to get out of the way during the sealing process



Evaporator
mounted on flange

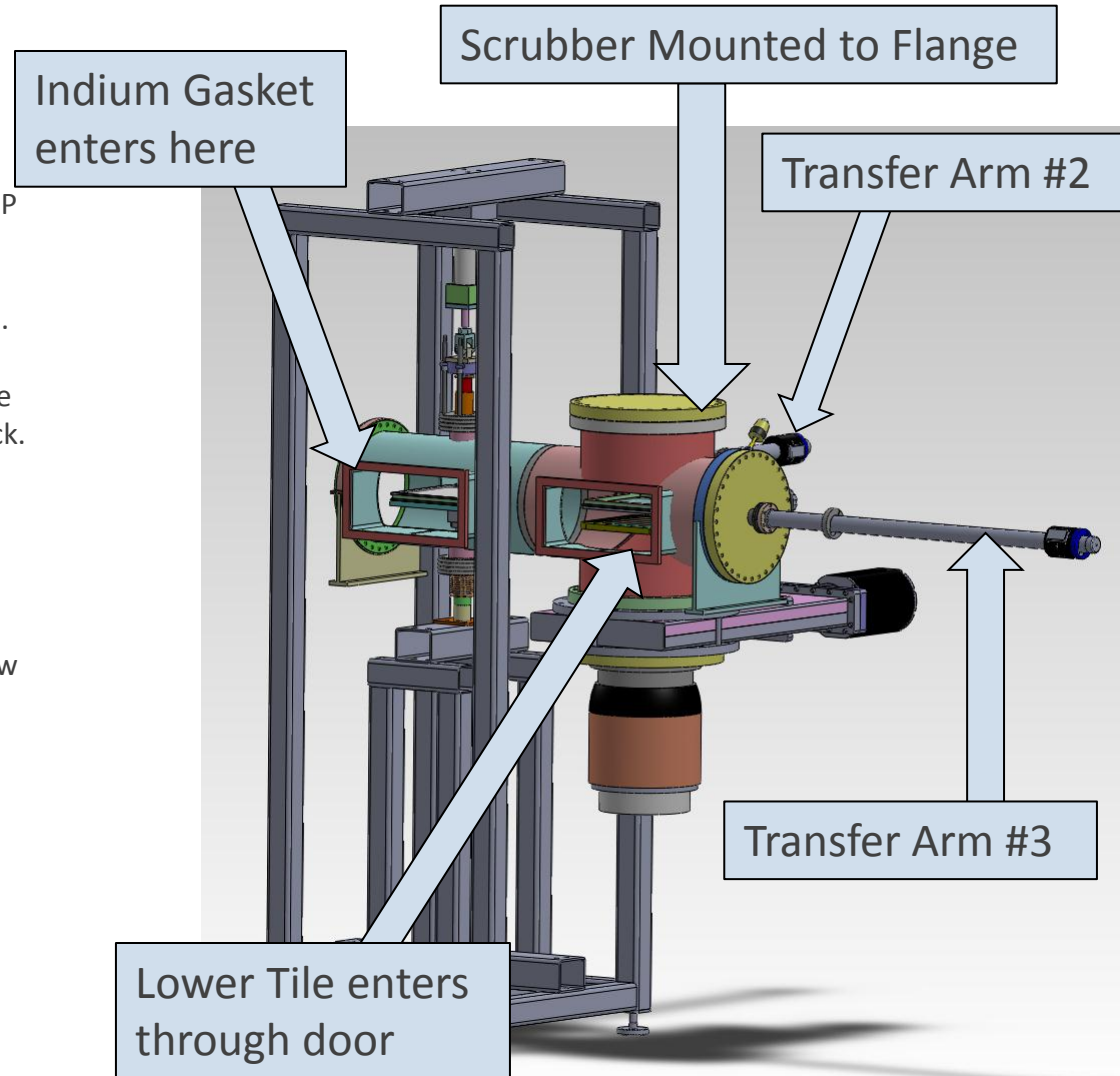
Chamber #3 Station #3 - Station #4 Scrubbing Station

1. Functions

1. Lower Tile entry port
2. Vacuum bake of Lower Tile
3. Activation of NEG Pump
4. As necessary UV or electron scrubbing of MCP stack
 1. The scrubber will be above the Lower Tile and it will be mounted facing down.
 2. Scrubbing will be monitored by measuring the current on the Lower Tile anodes as electrons strike the MCP stack.

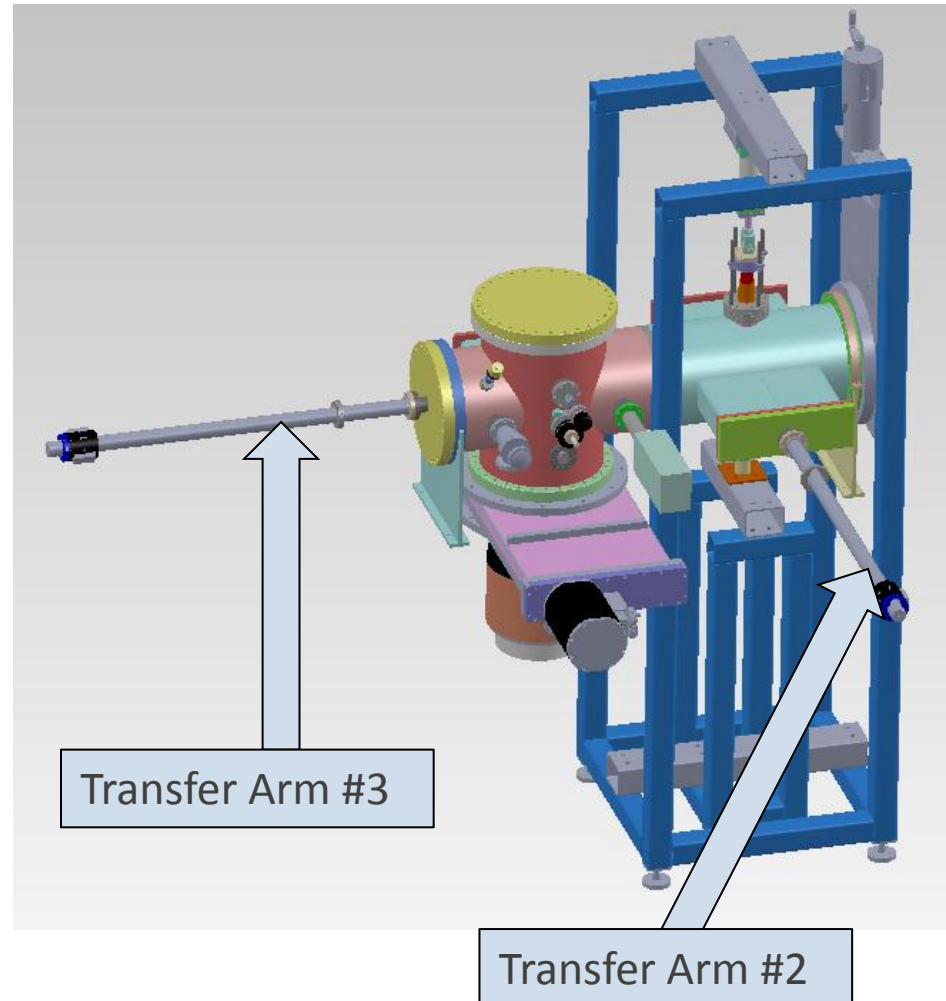
2. Sample Movement (using Transfer Arm #3)

1. Operator manually inserts Lower Tile onto Platen
 2. Transfer arm lifts Lower Tile (~ 1 inch)
 3. Transfer arm travels horizontally 36 inches
 4. Transfer arm lowers Lower Tile onto lower jaw of the Sealing Station
3. Total travel of 42 inches load of 8 lbs. without spatula



Chamber #3 Station #3 - Sealing station

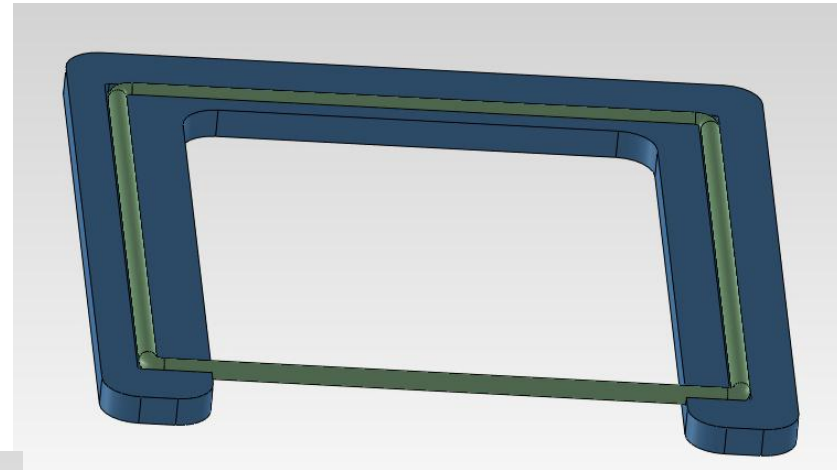
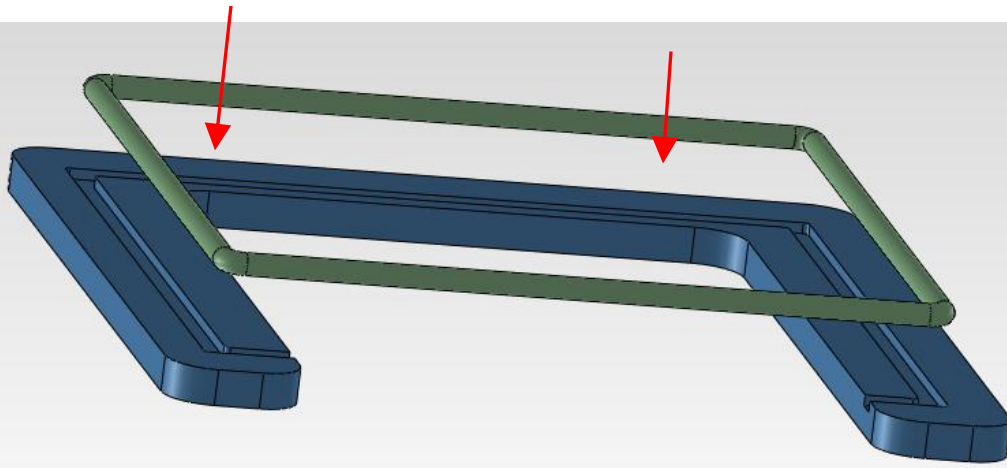
1. Station #3
 1. This will re-use the hydraulic cylinder and controls that was used for the smaller parts.
 2. Assembling the Lower Tile, indium seal, and the Top Window onto the lower jaw of the Sealer initiates the sealing process
 3. Hydraulic pressures will have the ability to me monitored remotely.
2. Sample Movement (using Transfer Arms #1 & #2 & #3)
 1. Transfer arm #3 will bring in the Lower Tile
 2. Transfer arm #2 will lower the indium seal onto the tops of the sidewall of the Lower Tile .
 3. Transfer arm #2 will retract away from the assembly
 4. Transfer arm #1 will bring in the Top Window from Station #2 and locate it over the indium seal
3. Total travel for transfer arm #2 is 24 inches. With load of 1 lbs. without seal holding spatula.



Transfer arm #2 - Loading the indium seal into the system

Step #1 The spatula is extended out through Door #2 to load the indium seal.

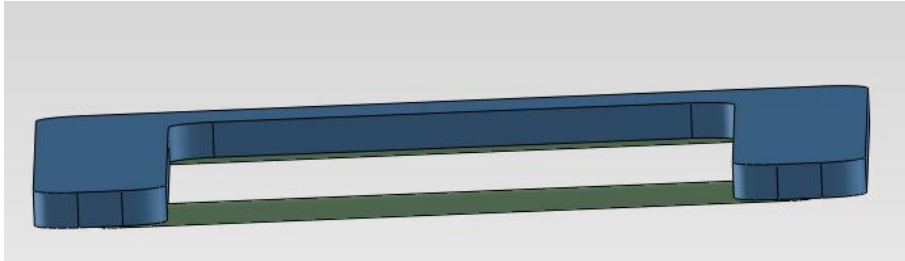
Step #2 The soft indium seal is placed into the groove in the spatula.



Step #3 The clasps that hold the seal in place are latched.

Step #4 The spatula is rotated 180 degrees and then retracted all the way into the system.

Transfer arm #2 - Placing the indium seal on top of the Lower Tile assembly.



Step #5 Once the Lower Tile assembly has been placed on the lower jaw of the compression station then the seal is placed.

Step #6 The spatula is moved forward over the Lower Tile and is lined up to its edge within $\pm .02$ inches.

Step #7 Open the clasps and place the seal

Step #8 The spatula is retracted back out of the so the Top Window can then be placed.

